

## AMENDMENTS TO THE CLAIMS

1. (currently amended) ~~In a~~

A process for operating a hydrogen generator having a variable hydrogen production rate output comprising:

~~i) wherein in response to a hydrogen production rate demand, externally provided~~  
providing raw materials ~~are introduced~~ at effective feed rates into the hydrogen generator to meet ~~the~~ a hydrogen production rate demand of the generator, the raw materials including a hydrocarbon feed, an oxygen gas and water;

~~, said materials comprising hydrocarbon containing hydrocarbon containing feed, oxygen-containing gas and water, and~~

~~ii) wherein hydrogen is generated by a process comprising:~~

reforming the hydrocarbon ~~containing~~ feed in the presence of steam to produce a reformat ~~containing~~ comprising hydrogen, carbon monoxide and carbon dioxide;

~~, and~~

converting at least some of the carbon monoxide in the reformat to carbon dioxide;  
~~by at least one of water gas shift and selective oxidation, and~~

at least partially combusting the hydrocarbon ~~containing~~ feed with the oxygen ~~containing~~ gas to provide heat for the reforming step;

~~the improvement comprising~~

~~a)~~

determining ~~the condition~~ conditions of the hydrogen generator including at least process temperatures;

determining conditions of the raw materials;

~~, and the condition of the hydrocarbon containing feed~~

~~b) electing~~

selecting predetermined feed rates for the raw materials using the conditions of the generator, the conditions of the raw materials and a look up table of predetermined values; and

~~based upon the determined condition of the hydrogen generator and the condition of the hydrocarbon containing feed, and~~

e)

controlling ~~the~~ a feed rate of each of the ~~externally-provided~~ raw materials to substantially the ~~selected~~ predetermined feed rates.

2. (currently amended) The process of claim 1 ~~wherein the hydrogen generator provides hydrogen~~ further comprising providing the hydrogen to a fuel cell to generate electricity over a range of electricity production rates and the hydrogen production rate is established by ~~the~~ a demand for the hydrogen by the fuel cell.

3. (currently amended) The process of claim 1 wherein the ~~predetermined rate of each of the externally-provided raw materials is defined by a bank of values~~ are specific to the hydrogen production rate demand of the generator.  
~~for the condition of the hydrogen generator and the condition of the hydrocarbon-containing feed.~~

4. (currently amended) The process of claim [3] 1 wherein the conditions of the hydrogen generator ~~is~~ are ascertained using sensors.  
~~by monitoring operating conditions.~~

5. (currently amended) The process of claim [4] 1 wherein ~~cascade control based upon monitoring operating~~ the conditions of the raw materials are established using a cascade control process.  
~~s the bank of values of the predetermined rates specific to the hydrogen production rate.~~

6. (currently amended) The process of claim 1 wherein the ~~predetermined rate of each of the externally-provided raw materials is~~ values are established by an algorithm, ~~specific to the hydrogen production rate and the condition of the hydrogen generator and the condition of the hydrocarbon-containing feed.~~

7. (currently amended) The process of claim 6 wherein the ~~operating~~ conditions of the hydrogen generator raw materials include a fuel value of the hydrocarbon feed.

is ascertained by monitoring operating conditions.

8. (currently amended) The process of claim 7 wherein cascade control ~~based upon monitoring operating conditions~~ establishes the algorithm,  
~~for the predetermined rates specific to the hydrogen production rate.~~

9. (currently amended) ~~In a~~

A process for changing the rate of hydrogen production by operating a hydrogen generator comprising;

by changing the feed rates of externally provided

providing raw materials at effective feed rates into the hydrogen generator, said the  
materials comprising fuel, an oxygen -containing gas, and water,

reforming the whereby fuel is reformed at elevated temperature in the presence of  
steam to produce a reformat eontaining comprising hydrogen, carbon monoxide and  
carbon dioxide;

~~, and~~

converting at least some of the carbon monoxide eontained in the reformat e is  
converted to carbon dioxide;

~~said process having a transition rate limiting operation, the improvement~~  
~~comprising~~

determining conditions of the generator;

determining conditions of the raw materials;

selecting predetermined feed rates for the raw materials using the conditions of the  
generator, the conditions of the raw materials and a look up table of predetermined  
values;

controlling a feed rate of each of the raw materials to substantially the  
predetermined feed rates;

performing a transition rate-limiting operation; and

controlling the a rate of change of the feed rate of each of the externally provided  
raw materials in accordance with a predetermined rate commensurate with the rate of  
change in the transition rate-limiting operation.

10. (currently amended) The process of claim 9 wherein the ~~hydrogen~~ generator provides the hydrogen to a fuel cell to generate electricity over a range of electricity production rates and the hydrogen production rate is established by the electricity production rate.

Claim 11 (canceled)

12. (currently amended) The process of claim ~~11~~ 9 wherein the conditions of the raw materials include a fuel value of the fuel.  
~~at least one externally provided raw material comprises water for reforming.~~

13. (currently amended) The process of claim ~~12~~ 9 wherein ~~at least a portion of the conversion of carbon monoxide to carbon dioxide is effected~~ the converting step is performed by preferential oxidation in the presence of free oxygen,  
~~, and the at least one externally provided raw material comprises free oxygen for the preferential oxidation.~~

14. (currently amended) The process of claim ~~12~~ 9 wherein the conditions of the generator include process temperatures, effluent temperature and system pressure.  
~~ratio of said at least one externally provided raw material to fuel is sufficient and is maintained for a sufficient portion of the transition period to accommodate slower responding conditions.~~

15. (currently amended) The process of claim ~~12~~ 9 wherein ~~the ratio of said at least one externally provided raw material to fuel is sufficient and is maintained for a sufficient portion of the transition period~~ the controlling the rate of change step is performed to attenuate adverse transient responses.

16. (currently amended) A method for ~~maintaining~~ operating a hydrogen fuel processor with low levels of carbon monoxide ~~in a hydrogen fuel processor, said method~~

comprising: adjusting a water to hydrocarbon fuel ratio and an air to hydrocarbon fuel ratio in accordance with a predetermined algorithm, wherein said fuel processor comprises a supply of said hydrocarbon fuel, and water and steam supplied to a reactor to produce hydrogen fuel comprising hydrogen and carbon monoxide, followed by the reduction in concentration of said carbon monoxide in said hydrogen fuel by passing said hydrogen fuel first to at least one water gas shift reactor and then to at least one preferential oxidation reactor, wherein said water is added to the hydrocarbon fuel prior to said hydrocarbon fuel entering said reactor, and wherein air is added to said at least one preferential oxidation reactor in accordance with said algorithm, wherein said algorithm comprises determining a target hydrocarbon fuel flow (B) and a current hydrocarbon fuel flow (A), then determining a present difference  $(D)=(B)-(A)$ , and then comparing said difference (D) with a predetermined threshold value to determine whether said fuel processor is turning up production of hydrogen, turning down production of hydrogen or operating at a steady state mode and wherein a higher ratio of water to fuel and air to fuel is added when said fuel processor is turning up production for a preset period of time than when said fuel processor is operating at a steady state mode and wherein a lower ratio of water to fuel and air to fuel is added when said fuel processor is in a turning down of production mode.

17. (previously presented) The method of claim 16 wherein said target hydrocarbon fuel flow and current fuel flow are measured periodically and said difference is then calculated to determine whether to increase, decrease or not change said ratios of water to fuel and air to fuel.

18. (previously presented) The method of claim 16 wherein upon a change from said turning up mode or said turning down mode to said steady state mode, there is a delay for a preset period of time prior to commencement of said predetermined ratio for said steady state mode.

19. (previously presented) The method of claim 16 wherein the fuel processor contains at least two preferential oxidation reactors, wherein an approximately equal flow

of air is added to each of said preferential oxidation reactors.

20. (previously presented) The method of claim 16 wherein after said hydrogen fuel passes through said preferential oxidation reactors, said hydrogen fuel contains no more than 50 ppmv carbon monoxide at any time during operation of said preferential oxidation reactors.